REQUEST FOR RECONSIDERATION

Claims 1-6 and 8-13 and 19-20 remain active in this application.

The claimed invention is directed to a process for the preparation of dendritic or hyperbranched polyurethanes, dendritic or hyperbranched polyurethanes and methods for producing reaction products of dendritic or hyperbranched polyurethanes.

Dendritic or hyperbranched polyurethanes have found industrial applicability but have suffered from costly and complex preparation techniques. Simpler and less costly techniques are sought.

The claimed invention addresses this problem by providing a method for preparing dendritic or hyperbranched polyurethanes by reacting diols or polyols having **1) at least one tertiary nitrogen atom; and 2)** at least two hydroxyl groups, having **differing reactivity** toward isocyanate groups, with diisocyanates of polyisocyanates. Applicants have discovered that reaction of diols or polyols having **at least one tertiary nitrogen atom** and at least two hydroxyl groups having **differing reactivity** toward isocyanate groups to provide a simple method for the preparation of dendritic or hyperbranched polyurethanes. Such a process and dendritic or hyperbranched polyurethane are nowhere disclosed or suggested in the cited reference of record.

The rejection of claims 1-6, 8-13 and 19-20 under 35 U.S.C. §103(a) over Reich et al. U.S. 4,786,682 in view of Bruchmann et al. U.S. 6,376,637 is respectfully traversed.

The cited combination of references fails to disclose or suggest a process in which a polyol component having at least one tertiary nitrogen atom and at least two hydroxyl groups having differing reactivity is reacted with isocyanates.

Reich et al. fails to disclose or suggest the formation of polyester (meth)acrylates having at least one tertiary nitrogen atom and at least two hydroxyl groups having differing reactivity.

According to Reich et al. a compound having a primary or secondary amino is reacted with an acrylate in a Michael addition (column 3, lines 4-18). In addition to being a primary monoamine (column 3, lines 27-34) , the compound having a primary or secondary amino group may also have a second amino group or at least one hydroxyl group (column 3, lines 35-44). Of the alkanol amines, only primary alcohols of ethanolamine, propanolamine and butanolamine are disclosed (column 3, lines 42-44).

Moreover, the (meth)acrylate need not even have a hydroxyl group present. Specifically the polyester (meth)acrylate or polyether(meth)acrylate preferably contains from 1-5 (meth)acrylate groups and from **0** to 3 hydroxyl groups (column 2, lines 1-3). In the esterificaiton process, the molar ratio of (meth)acrylic acid is chosen so that **no hydroxyl groups** or the desired number of hydroxyl groups remain in the molecule. Accordingly, **hydroxyl group are not required** in the reactive (meth)acrylate and even if present there is no disclosure of the hydroxyl group being of primary, secondary or tertiary structure.

Thus, the reference describes reaction of an amino group containing compound which does not necessarily have a hydroxyl group with a (meth)acrylate which does not necessarily have a hydroxyl group such that there is no requirement that the Michael addition product have two hydroxyl groups. The Michael addition product is similarly described as having only one hydroxyl group.

In view of the weak disclosure of having at least two hydroxyl group, there is certainly no disclosure of having at least two hydroxyl groups **having differing reactivity**.

As noted above, the only disclosure of the hydroxyl groups of the reactive amino compound is of **primary hydroxyl groups**. There is no written disclosure as to the functionality of the optional hydroxyl groups in the (meth)acrylate component. Accordingly, there is no suggestion that the Michael addition product have at least two hydroxyl groups of **different reactivity**. Certainly, since the suggestion to have at least two hydroxyl groups is

weak, there is no suggestion to have at least two hydroxyl groups of differing reactivity. Moreover, there is no disclosure as to the reactivity of any hydroxyl groups in the final Michael addition product such that having at least two hydroxyl groups of differing reactivity would not have been obvious.

Further more, in a preferred embodiment at least some or all of the hydroxyl groups are introduced into the molecule by means of the hydroxyl-containing amino group (column 3, lines 61-63). Since the hydroxyl groups would come from the same the hydroxyl-containing amino group, the concept of hydroxyl groups of differing reactivity is not suggested.

Bruchmann and Reich Are Directed To Different Fields Of Polyurethane Chemistry

Page 3 of the official action asserts that Bruchmann et al. and Reich et al. are from the same field of endeavor with respect to polyurethane products.

With all due respect, such an assertion is an oversimplification of the field of polyurethanes.

Polyurethane products may differ based on their structure and application field. Bruchmann et al describes dendritic or hyperbranched polyurethanes which usually have a high viscosity due to the structure. In contrast, Reich et al. describes urethane (meth)acrylates having very high reactivity on radiation and **at the same time a low viscosity** (column 1, lines 51-53). Thus, it can not be said that the two cited references are from the same field of endeavor, based on the differences in properties. Therefore, given the different fields of endeavor, it would not have been obvious to use the Michael addition product of Reich et al to make a dentritic or hyperbranched polyurethane as described by Bruchmann et al.

In view of the deficiencies of the disclosures of the cited art, the claimed invention would not have been obvious and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

The rejection of claims 1-6, 8-13 and 19-20 under 35 U.S.C. §103(a) over Perez et al. U.S. 4,786,682 in view of Bruchmann et al. U.S. 6,376,637 is respectfully traversed.

None of the cited references disclose or suggest a diol or polyol having at least one tertiary nitrogen atom and **at least two hydroxyl groups of differing reactivity** towards isocyanate groups being reacted in two steps to prepare a dendritic or hyperbranched polyurethane.

Perez et al. merely describes a Michael addition product formed by reacting a material (a) one or more primary and/or secondary amino groups and additionally contains one or more hydroxyl groups with a material (b) containing at least two α,β-ethylenically unsaturated moieties wherein **the addition product** contains hydroxyl functionality (column 2, lines 11-23). The hydroxyl groups in the Michael adduct are capable of reacting with a curing agent in the formation of a coating composition, forming a crosslinked film (column 6, lines 3-8).

A Compound Containing At least Two Hydroxyl Groups Of Different Reactivity Is Not Suggested By Perez et al.

Perez et al. identifies reaction of compounds (a) such as a dialkanolamine with compounds (b) having at least two α,β-ethylenically unsaturated moieties. As compound (b), preferably is suggested ethyleneically unsaturated materials as acrylate functionalities (column 2, lines 53-67). Suitable acrylate functional materials are identified as polyol polyacrylates of which polyesterpolyol polyacrylates are given as an example (column 3, lines 6-17). One method of preparing a polyesterpolyol polyacrylate would be to react a

hydroxyalkyl acryalte with a lactone (column 4, lines 4-6), followed by reaction with a dicarboxylic acid in the formation of a polyester polyol polyacrylate. This polyester compound has **no hydroxyl groups** such that upon reaction with compound (a), a Michael addition product will not be formed having at least two hydroxyl groups of different reactivity. In the absence of the formation of a compound having at least two hydroxyl groups of different reactivity, the combination of this reference with Bruchmann et al. fails to suggest the claimed invention.

Page 5 of the official action asserts the examiner's belief that Perez discloses a Michael addition product having at least two hydroxyl groups, but fails to identify how the presence of at least two hydroxyl groups is a disclosure of at least two hydroxyl groups having **differing reactivity**.

As discussed above hydroxyl groups will differ in reactivity based on steric considerations, primary hydroxyl groups typically being more reactive than secondary hydroxyl groups which are typically more reactive than tertiary hydroxyl groups. The office action fails to identify how a disclosure of **at least two** hydroxyl groups would make obvious at least two hydroxyl groups having differing reactivity. In short a disclosure of at least two hydroxyl groups is not a disclosure of at least two hydroxyl groups having differing reactivity.

In contrast, the claimed invention is directed to **a process** for preparing a dendritic or hyperbranched polyurethane by reacting a diol or polyl having at least one tertiary nitrogen and at least two hydroxyl groups of **differing reactivity**, in which higher reactivity hydroxyl groups are predominantly reacted with isocyanate groups in a first step and lower reactivity hydroxyl groups are reacted with isocyanate groups in a second step. Since Perez et al. fails to suggest a Michael addition product which has at least two hydroxyl groups having

differing reactivity, the claimed process, would not have been rendered obvious by this reference.

In view of the deficiencies of the disclosures of the cited art, the claimed invention would not have been obvious and withdrawal of the rejection under 35 U.S.C. §103(a) is respectfully requested.

Applicants submit that this application is now in condition for allowance and early notification of such action is earnestly solicited.

Respectfully submitted,

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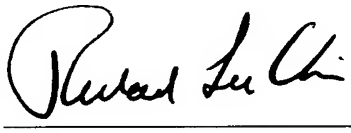

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